

**Dinkey Creek Decision Priorities
Fisher Marking Guidelines, Pine Species Composition and other Resource
Objectives**

V10 dated 9/9/2009
V11 dated 9/4/2013
V12 dated 9/25/2013

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Purpose: The purpose of this document is to provide guidance during implementation in areas where there is suitable fisher habitat in order to retain key features while designing restoration projects. The document will be reviewed and revised as needed to ensure we are incorporating needed changes as we learn from project monitoring and research data as well as current literature. Elevation and forest types will need to be considered when applying the guidelines.

I. General Principles

The Dinkey Creek Project is implementing the landscape, ecological vision of *An Ecosystem Management Strategy for Sierran Mixed-Conifer Forests* (North et al, 2009), the PSW-GTR-220, and the Dinkey Planning Forum's interpretation of the topographic-based design criteria including the slope position matrix.

Heterogeneity is a key concept in the GTR: avoiding even spacing of residual trees and protecting unique structures including wildlife trees, black oaks, snags and large logs, clumps of large trees, understory vegetation including shrubs and other hardwoods.

A goal of the Decision Priorities is to balance the desire for a fire resilient, healthy forest (healthy = management actions will trend the project area towards a more appropriate species mix, density and age distribution) with the fisher's association with "maximum biomass" in the habitat modeling work of the Conservation Biology Institute (June 2008).

A large-tree dominated forest with areas of higher canopy cover benefiting the Pacific fisher (63% home range, > 60 canopy cover: Zielinski et al. 2004) and other rare, old forest associated species.

None of these individual goals are meant to override the mutual desire for a healthy, fire resilient forest, but instead are intended to provide ecological balance (i.e. fishers are part of the healthy forest vision) to marking crews as they implement prescriptions.

II. Topographic Position Orientation

1. Orient to topographic position on maps where you are working (northerly canyon, southerly ridge, etc. from zone maps in North et al.)
2. Review principles for zone based on topographic matrix created in project description.
3. In drainages & canyon zones, leave some overtopping and denser conditions. As you move away up slope, you have to separate age classes so they are clumpier and separated.

4. Marked clumps should be overlaid with wildlife data and LiDAR and/or aerial photos to get a better sense of preferred habitat.

III. Tree Selection Guidelines related to Micro-Site Priorities and Additional Ecological Objectives

5. **Selection:** Select white fir and incense cedar, in general, over pine due to uncharacteristic departure from historic conditions, fire susceptibility, density etc.
6. **Hazards:** Remove hazards near structures and developed sites. Leave large trees for downed wood ecological requirements after felling unless triggering fuels standards.
7. **Snags:** Retain all snags that are not hazards. Smaller soft snags exhibit very high use in the project area. Retain (or create) snags where appropriate in project design. Avoid marking that applies averages across unit areas, rather clump and provide un-even distribution of snags while attaining ecological goals.
8. **Growth:** Maintain dominant and co-dominant trees in each cohort. Avoid leaving suppressed or intermediate trees except to meet wildlife micro-site habitat. Wildlife habitat needs include hiding cover, canopy layers not “stacked” underneath larger residual trees.
9. **Priorities for Retaining Species**
 - a. Leave all black oaks. All black oaks will be released (thinning to outer drip line and considering south-facing position of surrounding trees) unless it has high levels of rot and does not appear to have the ability to develop a callous over wounds. For such oaks, allow overtopping by conifers.
 - b. Healthy sugar pine second choice, leaving sugar pine resistant to White Pine Blister Rust.
 - c. Jeffery Pine is third priority.
 - d. Lodgepole is forth priority.
 - e. Incense cedar and white fir are given last priority.

10. Wildlife—Macro and Micro-Site Considerations

The Dinkey Creek project landscape trends for sound wildlife management strategies balance species needs (both sensitive and common) at a variety of spatial (micro-site to foraging landscape) and temporal (intermediate to long-term population viability) scales (GTR p. 10). Approximately 88% of fisher resting structures are generally trees >20” (from Sequoia NF, Zielinski et al. 2004 data).

Fishers select the largest individual trees in dense canopy stands. There is a low level of reuse of these resting structures (Zielinski 2004b) so many large trees are required. This behavior makes provision of adequate resting habitat critical to fisher conservation (GTR p.10).

Wildlife tree micro-site characteristics include (Review Photographic Field Guide (found in Appendix))

- a. Snags of various size classes and live defect trees and the largest trees in general with cavities, broken tops, cavities and “witches broom” components have high wildlife value.
- b. Decadent black oaks have disproportionate levels of use as habitat trees.
- c. Amounts of larger diameter, older black oaks will differ per project. As an example Soaproot has oaks; Dinkey South not as many and the oaks that are there are not necessarily decadent. Dens have been located in smaller-to-large size classes.
- d. Retain known nest and roost trees (provide description, flagging). Retain potential nest and roost trees for a range of wildlife species (see photo guide for den/rest site identification traits).
- e. Marking in clumped distribution of leave trees rather than an even-spacing distribution of leave trees. This will trend stands toward a more heterogeneous distribution of residual trees and will more resemble historic conditions see 15 below (GTR p.5)
- f. Microclimate can be created by rock outcropping, hardwoods, conifer snags and logs in proximity to water.
- g. Cooler microclimates are preferred.

10. Platforms

Leave trees less than 10 inches DBH regardless of quality adjacent to fisher resting platforms that provide escape or hiding cover into the fisher resting platform. All trees less than 10 inches DBH that provide escape or hiding cover are trees that block or obscure the view of the tree bole of the platform tree. Leave tree directly adjacent plus any additional trees that provide for escape. Retain smaller trees leaning on larger structures in fisher clumps for travel pathways. Leave no more than 3 trees less than 10 inches DBH deep from the platform tree. No more than 3 platform trees should be identified per acre. When more than 3 platform trees are present on an acre, then leave trees less 10 inches DBH adjacent to those platforms that have the most rot. Fisher resting platforms include trees greater than 30” DBH with the following qualities: limbs greater than 8” diameter at the main trunk, trees with deformities creating platforms, trees with obvious rot or cavities. Fisher resting platforms include dead trees greater than 20 feet tall with the following qualities: cavities, broken top with greater than 18” diameter at top.

All small trees stay in platform tree patches to hide the bowl of the platform tree and to provide alternate routes for fisher. Escape trees associated with fisher platforms will not be included in the spacing guides.

This affects the post harvest treatment and needs to go to fuels officer to input into burn plans for District. Piles may be left if approved by fuels officer, silviculturalist and wildlife biologist. The benefit of leaving the piles is to provide potential prey cover. Leave piles are best located on the cooler, north side of large tree clumps out of constant direct sunlight.

Consider creating snags and down logs where LRMP standards are not being met. Snags are retained on a 10 acre basis, snag patches are highly valuable and should not be evenly spaced similar to live trees.

This affects TSI work more so than marking crew: For the purpose of restoration projects, snags or trees that have platforms but lack sufficient cover for a true rest sites: leave snags or large trees >24 inches that have a platform for resting or may be occupied, use one every 2/3 acre. In areas with low abundance of platforms we leave those all included the small trees surround it.

11. Disease

Understory trees (<20") with mistletoe, white pine blister rust, and damage are discriminated against. Trees >20" with damage or rot remain to provide wildlife habitat. Trees with less mistletoe or those with mistletoe in the lower third or where the mistletoe is found on the outer crown remain over those with high amounts of mistletoe and infections close to the bole or in the upper two thirds of the crown. Damaged or diseased trees should be removed prior to healthy trees. Maintaining trees with good form and growth is higher priority than spacing or target structure.

12. Erosion

Trees along stream banks remain to provide stability, prevent accelerated soil erosion, and provide habitat. Female fisher show high levels of use in Riparian Conservation Areas. Maintain high fisher habitat values in this zone. Higher levels of canopy cover, snags, large trees and understory vegetation.

13. Crown Position

Trees in the lower crown layers are removed to provide space for trees in the upper crown layers. Crown position is a strong indicator of a trees ability to make use of site resources. Leave dominant and co-dominant trees in each cohort.

14. Fuel Ladders

Trees that provide fuel ladders to larger trees are removed to create conditions suitable for underburning and reduce the potential for torching. Protecting larger trees from underburning maintains stand structures that will contribute to future habitat diversity. Canopy layering is reduced in the WUI by accentuating age classes (e.g. a 10" tree among 30" trees is removed to accentuate the 30" class). Maintain canopy layering in PACs and HRCAs outside WUI defense.

IV. Clumps & Openings

15. Clump Retention and Promotion

Clumps of trees are a grouping of trees identifiable by density, species mix, tree size or presence of snags). Clumps have an identifiable edge, they can be walked around.

Residual clump density works in combination with overall stand density to accomplish heterogeneity and desired condition. Residual basal areas post-treatment are defined in separate table based on topographic position, forest type and site index.

16. Dense Tree Clumps for Pacific Fisher and Restoration

Micro-sites is a topographic or localized forest feature that can be identified on the ground – meadow, stream, seep, canopy opening

These conditions provide opportunity for clumps:

- Presence of large cavities
 - Presence of snags
 - Large Oak (>18 inches) with some decadence
 - Where large woody debris (24 inches in diameter, 20 feet long)
 - Proximity to (approximately 300 feet) water...closer to water
- Keep in mind: As you decrease in elevation what becomes higher quality determines by types of cavity trees, changes in temperature and not just overall density.
 - a. **High Quality Fisher Rest Sites:** These sites are found rarely across the Dinkey area and tend to be located on steeper slopes and near (<300 ft) water. High Quality fisher rest sites are composed of clumps of five or more trees > than 30" for conifers and oaks over 20 inches with a density greater than 240ft²/acre and the presence of fisher rest structures (large legacy trees, cavities and rarely downed logs). These clumps not only have high density but deep canopies. The size of the large trees, deep crowns, location near water, canopy cover, and along with rest structure(s) makes these sites particularly useful to fisher. Canopy is typically split between upper canopy and lower canopy layers. Treatments should be limited to the edges or removing limited layering to keep the dense character of these sites.
 - b. **Moderate Quality Fisher Rest Sites: Clumps of dense (~>240 ft²/acre) trees with large (>35") snags, legacy trees or suitable large rest structures (snags, damaged or diseased trees > 20", oaks over 25 inches).** These rest sites are not rare across the Dinkey project. They are

characterized by the density of trees over 240ft/acre and the presence of one or more suitable rest structures. Rest structures are typically large older legacy trees with large branches or a tree with a deformation that provides rest platforms. Higher value rest sites are found near water. Growing space (leaf area, canopy) is split between an upper canopy layer and a lower canopy layer. Canopy foliage composed of upper and lower layers can be stacked or more often found adjacent.

- i. **Fisher Objective:** Maintain $> 240 \text{ ft}^2/\text{acre}$ or more in most clumps with structure. Leave clumps untreated near stream or meadow. Removals should be focused in suppressed and intermediate trees. These structures are particularly important near meadow and wet area micro-sites. Retain integrity of these areas by limiting removals to edges of clump- keep all snags that are not hazards.
 - ii. **Restoration Objective:** Promote heterogeneity, focus on retaining and promoting pine, removals around edges of the clump to protect from fire and promote pine growth.
- c. **Lower Quality Dense Sites: High density clump ($> 240 \text{ ft}^2/\text{acre}$), trees $> 24''$:** These clumps are composed of dense single layered trees generally greater than 24" DBH. While crowns are dense, canopy cover is found in mostly a single layer. This single layer of canopy is found high above the forest floor. While snags may be found in these clumps, the size of snags or decay class offers few resting platforms. While trees are over 24", live trees offer few resting platforms. While some clumps are dense, they have few Pacific fisher rest platforms.
 - iii. **Restoration Objective:** Retain integrity and density of $240 \text{ ft}^2/\text{acre}$ in these clumps except when clumps have scattered pine, use decision priority on "scattered pine." Removals should be focused in all cohorts 10" to 30".
 - iv. **Fisher Objective:** Retain large tree structure and density.
- d. **Lowest Quality Dense Sites: High Density clump ($> 240 \text{ ft}^2/\text{acre}$), trees $< 24''$:** While these clumps are dense they have few fisher rest platforms. The nature of the tree size and the crown cover found in a single canopy layer make these areas of low value regardless of location or proximity to water.
 - v. **Restoration Objective:** Promote heterogeneity across the stand by emphasizing a single canopy layer of the dominant cohort within a clump and by varying the resulting different types of clumps across the stand to create a future multi-storied stand. Remove poor growing, suppressed, and intermediate trees. Removals will benefit pine growth and future growth of residual trees. Remove trees

through all diameter classes and cohorts 10” to 30”. Restoration is associated with topographic zones and aspect. Clumps often have poor-growing fir and incense cedar that dominates clump structure. Focus removals on fir and incense cedar. Pine is found at a low frequency in these clumps. The nature of the tree size and the crown cover found in a single-canopy layer make these areas of low value regardless of location or proximity to water.

Retain all vigorous pine. Increase openness around single pines or small clumps of two or three. In larger clumps, having 50% or more basal area per acre in pine, reduce density to the basal areas for Jeffrey pine.

vi. **Fisher Objective:** Develop future multi-storied stands following restoration objective.

e. WUI and Non-WUI retain large down logs, saplings and shrubs associated with rest sites and potential platforms.

17. Pine Clumps

Maintain and promote clumps in areas of pine where the 40% or greater of the basal area is made up of pine (clumps are typically 0.25 to 0.5 acres)

Promote the growth and health of the pine by thinning through the clump using the following ranges:

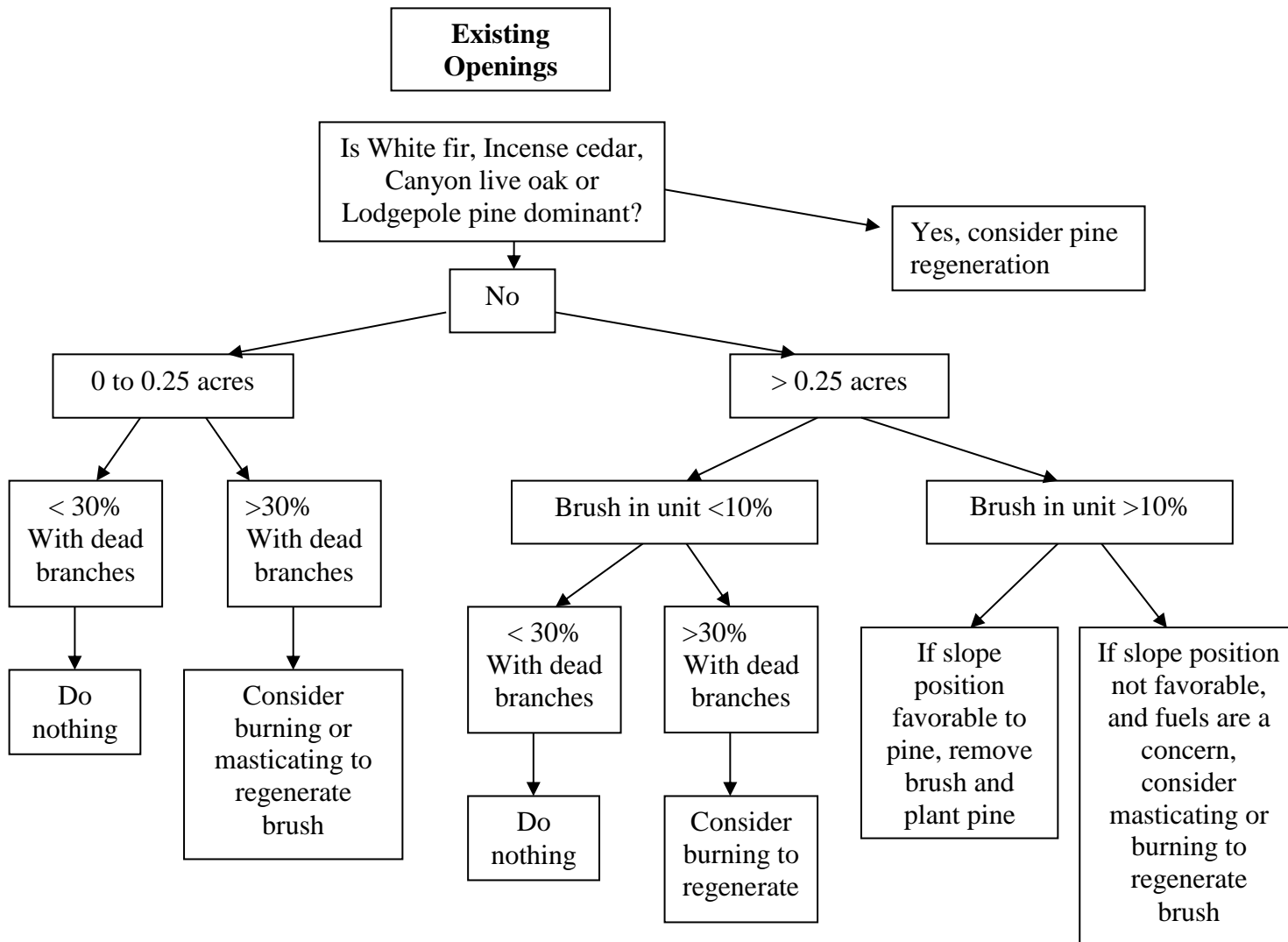
- a. North Slope: 60-75% (*high-higher*) of normal basal area (for what land can support)
- b. Canyon: 80% (*highest*) of normal basal area (for what land can support)
- c. South Slope: 55-60% (*low-moderate*) of normal basal area (for what land can support)
- d. Ridges: 40-55% (lowest) of normal basal area (for what land can support).

This thinning activity may result in some pine as well as other species being harvested.

18. Shrub Management

Maintain historic conditions of area in young brush age classes (less than 15 years old). Depending on topographic position, project area will maintain between 12-23% as openings covered with brush, less than 15 years of age (Lydersen and North 2012). In areas where frequent fire conditions promote pine, regenerate

pine in existing openings. This is not a uniform distribution and some areas may have 30% or more cover of brush.



19. Pine Regeneration and Planting

Promote the growth of young pine in small areas that have been previously planted or that currently support young pine. Plant additional pine in openings. Open and orient from southeast to southwest. For existing openings, remove trees to improve orientation and lighting to promote growth. Thin edge of regeneration sites to increase sunlight received. Thin within the existing planted pine clumps to give spacing to small trees.

a. Existing Openings with Good Soil. In forest types dominated with pine, promote the growth of pine species by planting pine seedlings in existing openings greater than 0.25 acre up to 10% of stand acreages. Plant pines with multiple seedlings per spot and space them consistent with site quality to reduce fuels continuity.

Feather the edges to increase light from the side. Reorient the openings so it promotes growth of pine. In forest types dominated by fir, maintain the openings or existing clumps.

1) Prior to planting, prepare the site for planting by tractor piling brush and burning piles. Spray with Accord herbicide (glyphosate) or hand release following planting to control vegetation that competes with seedlings for soil moisture and nutrients.

h. Small Canopy Openings with Shrubs and Pine/Oak Regeneration in Forest Types with Mixed Pine. Maintain shrubs as habitat, reduce fire risk associated with shrubs, and promote regeneration of pine. Historically, shrubs likely would have covered 10–25% of the project area. The objective is to have 10% of the mixed pine forest type in shrubs. Do not create openings or plant shrubs to achieve the 10% coverage goal. Adhere to the following conditions to enhance small openings with shrubs:

- 1) If a shrub patch is less than 0.25 acre and mostly living, do not treat it.
- 2) If a shrub patch is less than 0.25 acre and consists of mostly dead branches (roughly greater than 30% is dead), consider burning or masticating to regenerate shrubs.
- 3) If a shrub patch is greater than 0.25 acre but the shrubs are less than 10% of the treatment area, then do not treat the living shrubs and consider burning or masticating shrubs composed mostly of dead branches (roughly greater than 30% is dead).
- 4) If a shrub patch is greater than 0.25 acre and the shrubs are more than 10% of the unit area, remove shrubs and plant pine if the slope position is favorable to pine. If the slope position is unfavorable to pine, then consider burning or masticating the shrubs for regeneration.
- 5) Prior to planting, prepare the site for planting by tractor piling brush and burning piles. Spray with Accord herbicide (glyphosate) or hand release following planting to control vegetation that competes with seedlings for soil moisture and nutrients.

V. Outside Clumps

20. Pine-Exclusive Area

Promote the growth of pine where pine is dominant (>50% of basal area is pine). These areas are more open than mixed conifer units

21. Residual Stand Basal Area

Stand basal area targets are used to identify the residual stand density, use unit tables.

VI. Important Land Allocations

22. California Spotted Owl 300-Acre PACs

Treatments should be based upon ecological need although the current standards and guides allow treatment outside of 500' nest buffer using forest-wide standards and guides for mechanical treatments in the Defense Zone.

- *PACs in Defense Zone*--near homes, campgrounds, other facilities the treatments should meet fuels objectives. 500' nest tree has further restrictions.
- *PACs in Threat Zone*—treat surface and ladder fuels with the goal of achieving some fire resilience and meet habitat objectives.

23. California Spotted Owl Home Range Core Areas (HRCAs): 600 acres around nest area of the best available habitat on the Sierra National Forest.

Desired Conditions: At least 2 canopy layers, 24" trees in dominant and co-dominant trees, a number of large, very old trees (>45"dbh), at least 50-70% canopy cover, and higher than average snags and down wood.

Conduct pretreatment assessment by silviculturalist and wildlife biologist to assess relative abundance or lack of and determine if treating around the area is high, moderate or low quality sites.

The fisher photo guide provides a series of examples of actual structures used as rest sites and reproductive dens used by fisher within the Kings River Fisher Project. It is not ALL possibilities of what they may use. This data was collected by Pacific Southwest Research Station (PSW).

A PHOTOGRAPHIC FIELD GUIDE TO FISHER REST AND DEN SITES IN THE SIERRA NATIONAL FOREST

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(22 Sept 2013 version)



FISHERS AND FOREST HABITAT

■ What is a fisher?

- A mid-sized carnivore in the Mustelid (weasel) family
- Fishers are excellent tree climbers with a varied diet (*e.g., small mammals, birds, lizards, berries*)

■ Why the interest in fishers and their habitat?

- Historical fur trapping and loss of mature forest habitat led to population declines in western states
- Fishers are associated with extensive canopy cover, large trees, and forest features (*e.g., cavities*) that take time and unique conditions to develop
- As a result, conservation of suitable habitat often involves planning on managed lands

■ Purpose of this guide:

- Provide examples of actual structures used by fishers as reproductive dens and rest sites
- Give field crews clues about the microsites, structures, and habitat that fishers might use





FISHER REST & DEN SITES

■ What are fisher Rest Sites?

Places where fishers takes refuge from the weather and/or potential predators to rest when they are not traveling or foraging

■ Examples include:

- Large live trees with cavities, branch clusters, or large limbs
- Snags with cavities, broken tops, and/or basal hollows
- And structures near the ground – such as hollow logs, rock piles, and ground burrows

■ What are Reproductive Dens?

Trees with a cavities where females give birth and keep kits in spring

- Natal Dens: trees where females give birth and initially keep kits
- Maternal Dens: structures used after natal dens to house young kits that are still nursing

■ How many Rest and Den Sites do fishers use?

- Males and females use numerous rest sites during the year. Some sites are re-used, but apparently not frequently.
- All females with kits use 1 natal den, but # of maternal dens ranges (1 to 5).

MICROSITES

Fishers use a variety of microsites for thermal and physical protection. Characteristics associated with typical microsites may be useful in recognizing whether a particular structure or site might be used by a fisher. Microsite types include:



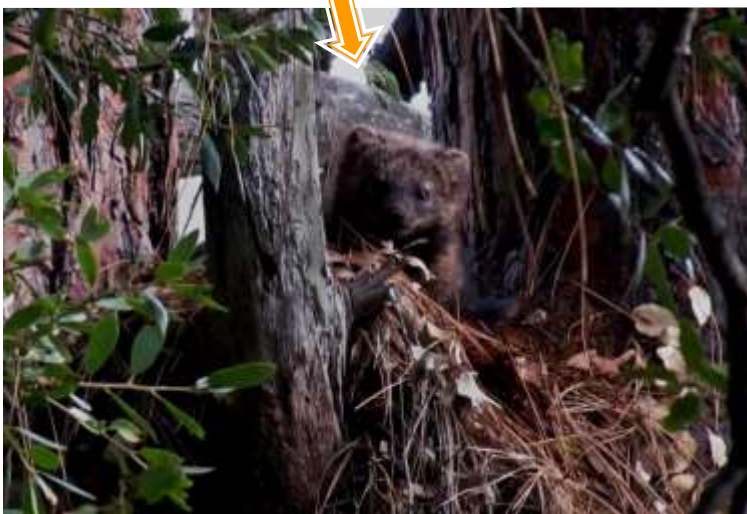
- Cavities in tree boles or logs

- Often accessed by broken limbs, woodpecker holes, scars or cracks

- Broken tops of snags

MORE MICROSITE EXAMPLES

- Branch clusters or deformities often associated with mistletoe
- Nests (pine needles, sticks)
- Large branches generally $\geq 6''$, often with flat platform
- Ground burrows/caverns in rocks



GUIDE AND TERM CLARIFICATION

This guide contains a variety of example rest and den sites used by fishers, but it does not fully represent the diversity of structures that they may use in the field. Den site examples are presented first followed by rest sites, with two consecutive slides per site. Slides for each den or rest site contain photos that should provide a general feel for the microsite, structure, and surrounding habitat. Relevant measurements are on the right hand side of the first slide. Orange arrows in photos are used to point out the fisher actually in the structure and/or the known microsite.

TERM CLARIFICATION:

- Structure type: used to denote whether the structure was a conifer or a hardwood, alive or dead, or some type of alternative structure
- DBH: diameter at breast height (~4.5 ft or 1.4 m)
- California Wildlife Habitat Relationship (CWHR) Classifications:
habitat type followed by tree size class and canopy cover category (see below)

- Tree Size Classes:

- 1(seedling, <1")
- 2(sapling, 1-5.9")
- 3(pole, 6-10.9")
- 4(small, 11-23.9")
- 5(medium/large, ≥24")
- 6(multi-layered, 5's and 4 or 3's and D cc)

- Canopy cover classes (%)

- B = barren (<10)
- S = sparse (10-24.9)
- P = open (25-39.9)
- M = moderate (39-59.9)
- D = dense (60-100)



NATAL DEN

#244

FEMALE FISHER

Structure Type:
Live Hardwood

Tree Species:
Black Oak

DBH:
27in (69cm)

Height:
74ft (23m)

Microsite:
Cavity

CWHR:
Sierran Mixed
Conifer 4D

Elevation:
4600ft (1400m)

NATAL DEN #244: Live Black Oak





NATAL DEN

#1597

FEMALE FISHER

Structure Type:
Live Conifer

Tree Species:
White Fir

DBH:
47in (119cm)

Height:
108ft (33m)

Microsite:
Cavity

CWHR:
Sierran Mixed
Conifer 5 M
(upslope 4 P)

Elevation:
5200ft (1590m)

NATAL DEN #1597: Live White Fir





NATAL DEN

#482

FEMALE FISHER

Structure Type:
Live Conifer

Tree Species:
Ponderosa Pine

DBH:
52in (132cm)

Height:
160ft (49m)

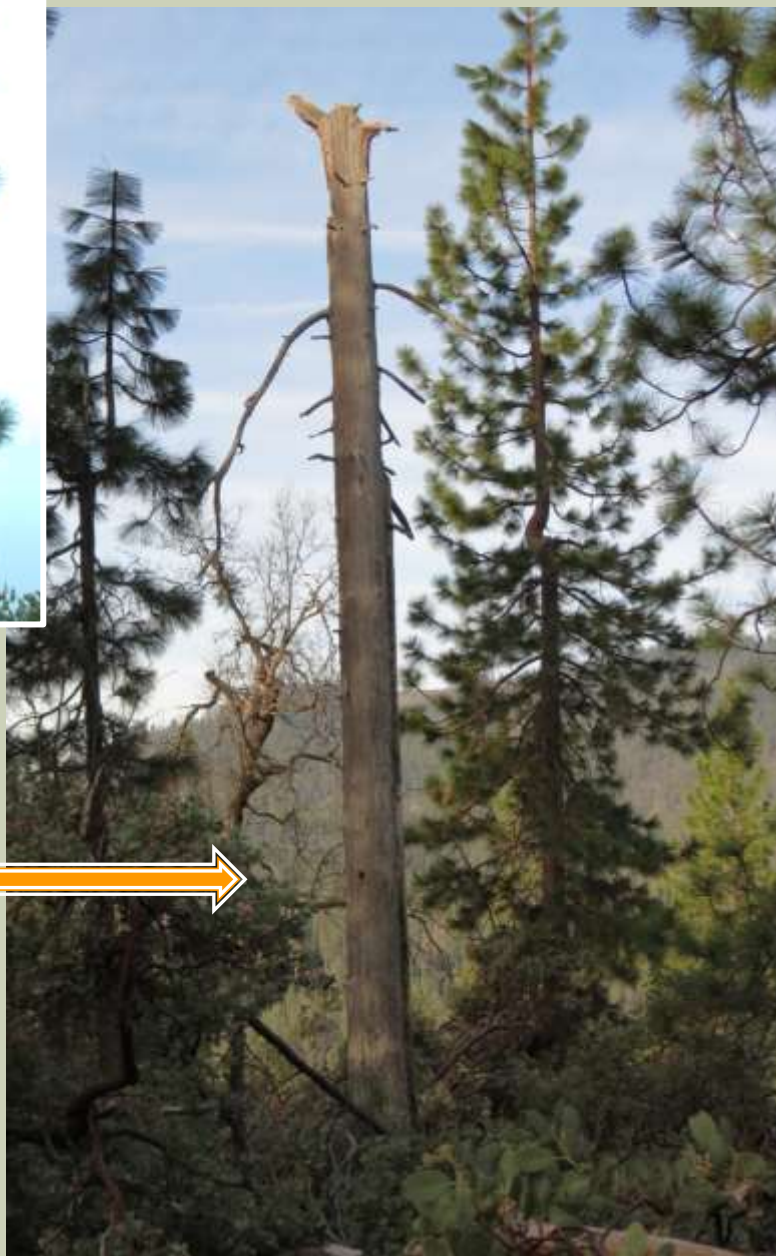
Microsite:
Cavity

CWHR:
Sierran Mixed
Conifer 5 D
(upslope 5 M)

Elevation:
6800ft (2070m)

NATAL DEN #482: Live Ponderosa Pine





NATAL DEN

#578

FEMALE FISHER

Structure Type:
Conifer Snag

Tree Species:
Ponderosa Pine

DBH:
39in (99cm)

Height:
50ft (15m)

Microsite:
Cavity

CWHR: Montane
Hardwood-Conifer 4P
w/ very tall shrubs
(surrounding area 4M)

Elevation:
4200ft (1280m)

NATAL DEN #578: Ponderosa Pine Snag





NATAL DEN

#642

FEMALE FISHER

Structure Type:
Live Hardwood

Tree Species:
Canyon Live Oak

DBH:
39in (98cm)

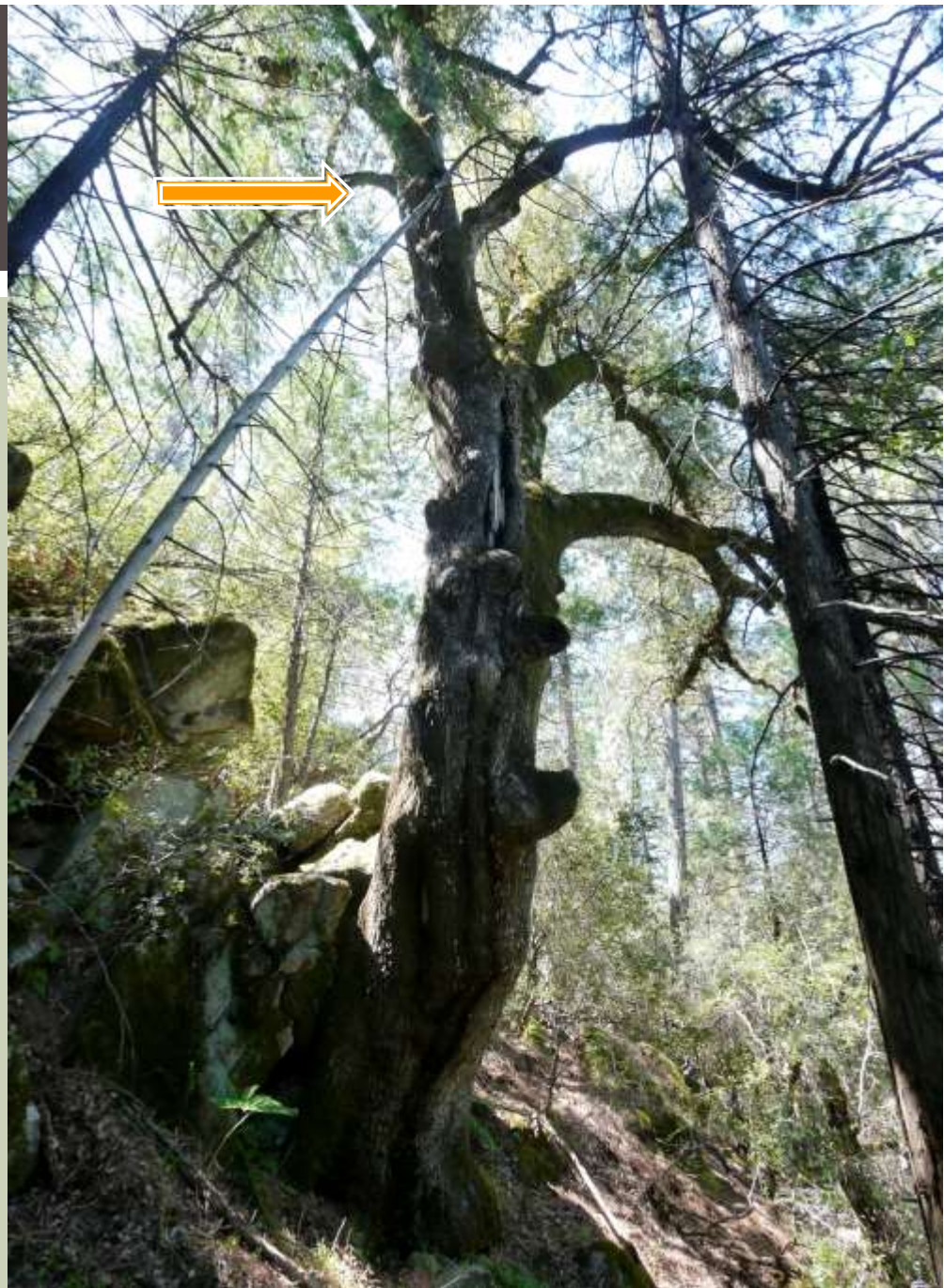
Height:
63ft (19m)

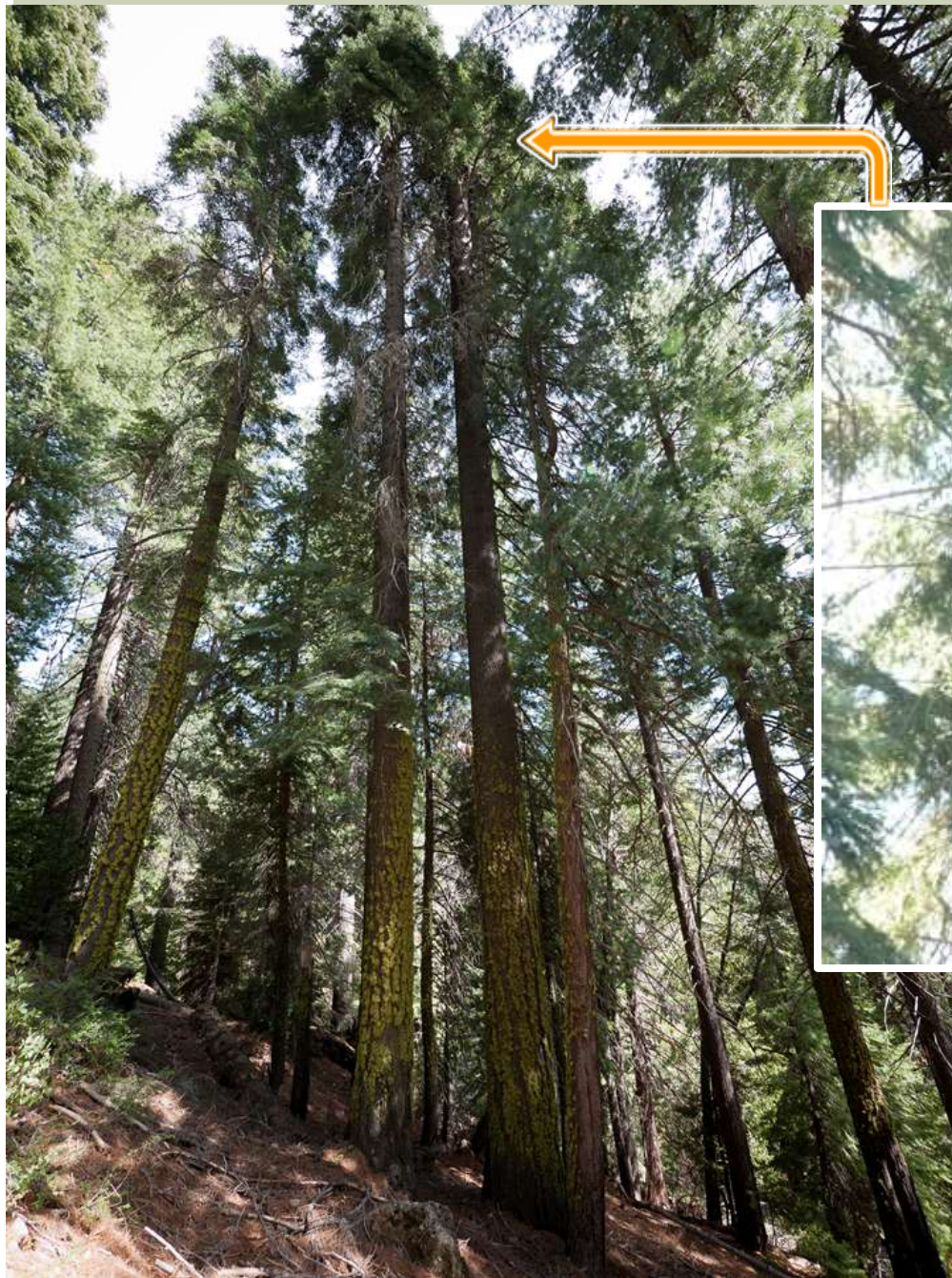
Microsite:
Cavity

CWHR:
Sierran Mixed
Conifer 6D

Elevation:
3700ft (1130m)

NATAL DEN #642: Canyon Live Oak





MATERNAL

DEN #802

FEMALE FISHER

Structure Type:
Live Conifer

Tree Species:
White Fir

DBH:
40in (102cm)

Height:
118ft (36m)

Microsite:
Cavity

CWHR:
Sierran Mixed
Conifer 6D
(close to 5M)

Elevation:
6400ft (1950m)

MATERNAL DEN

#802: Live White Fir





MATERNAL

DEN #762

FEMALE FISHER

Structure Type:
Conifer Snag

Tree Species:
White Fir

DBH:
45in (113cm)

Height:
78ft (24m)

Microsite:
Cavity

CWHR:
Sierran Mixed
Conifer 5D

Elevation:
5400ft (1650m)

MATERNAL DEN

#762: White Fir Snag





MATERNAL

DEN #700

FEMALE FISHER

Structure Type:
Live Hardwood

Tree Species:
Black Oak

DBH:
31in (78cm)

Height:
92ft (28m)

Microsite:
Cavity

CWHR:
Sierran Mixed
Conifer 5D

Elevation:
3700ft (1130m)

MATERNAL DEN

#700:

Live Black Oak





MATERNAL

DEN #391

FEMALE FISHER

Structure Type:
Conifer Snag

Tree Species:
Ponderosa Pine

DBH:
38in (97cm)

Height:
29ft (9m)

Microsite: Cavity

CWHR:
Sierran Mixed
Conifer 4M

Elevation:
5500ft (1680m)

MATERNAL DEN #391: Ponderosa Pine Snag



MATERNAL

DEN #48

FEMALE FISHER

Structure Type:
Conifer Snag

Tree Species:
Incense Cedar

DBH:
56in (143cm)

Height:
80ft (25m)

Microsite: Cavity

CWHR:
Sierran Mixed
Conifer 5D

Elevation:
5800ft (1770m)



MATERNAL DEN #48: Incense Cedar Snag



Surrounding habitat with coarse woody debris



REST SITE

#256

FEMALE FISHER

Structure Type:
Live Hardwood

Tree Species:
Black Oak

DBH:
27in (68cm)

Height:
46ft (14m)

Microsite: Cavity
in broken trunk

CWHR:
Sierran Mixed
Conifer 4M

Elevation:
5800ft (1770m)

REST SITE #256: Live Black Oak





REST SITE

#637

FEMALE FISHER

Structure Type:
Live Hardwood

Tree Species:
Black Oak

DBH:
29in (74cm)

Height:
68ft (21m)

Microsite:
Cavity

CWHR: Sierran
Mixed Conifer 4D

Elevation:
4500ft (1370m)

REST SITE #637: Live Black Oak





REST SITE

#593

MALE FISHER

Structure Type:
Live Conifer

Tree Species:
White Fir

DBH:
73in (185cm)

Height:
138ft (42m)

Microsite: Large
limb/broken fork

CWHR:
Sierran Mixed
Conifer 6D (on an
edge of P canopy)

Elevation:
5800ft (1770m)

REST SITE #593: Live White Fir





REST SITE

#1018

MALE FISHER

Structure Type:
Live Conifer

Tree Species:
Ponderosa Pine

DBH:
35in (89cm)

Height:
157ft (48m)

Microsite: Branch
cluster/needle
clump

CWHR: Sierran
Mixed Conifer 6D

Elevation:
3600ft (1100m)

REST SITE #1018: Live Ponderosa Pine





REST SITE

#435

FEMALE FISHER

Structure Type:
Live Conifer

Tree Species:
Sugar Pine

DBH:
59in (150cm)

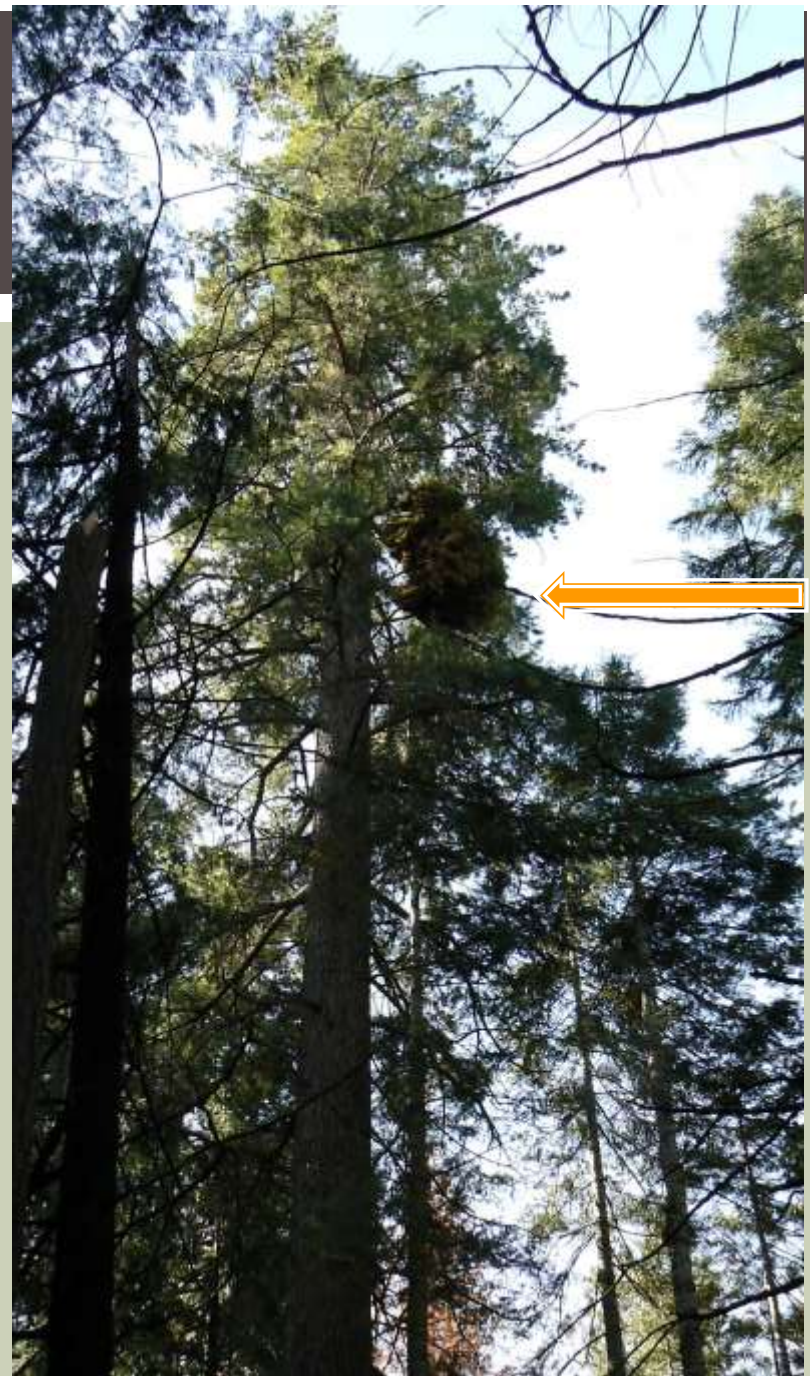
Height:
182ft (56m)

Microsite:
Mistletoe/branch
cluster

CWHR:
Sierran Mixed
Conifer 4M

Elevation:
4400ft (1340m)

REST SITE #435: Live Sugar Pine





REST SITE

#197

FEMALE FISHER

Structure Type:
Live Conifer

Tree Species:
Ponderosa Pine

DBH:
22in (57cm)

Height:
75ft (23m)

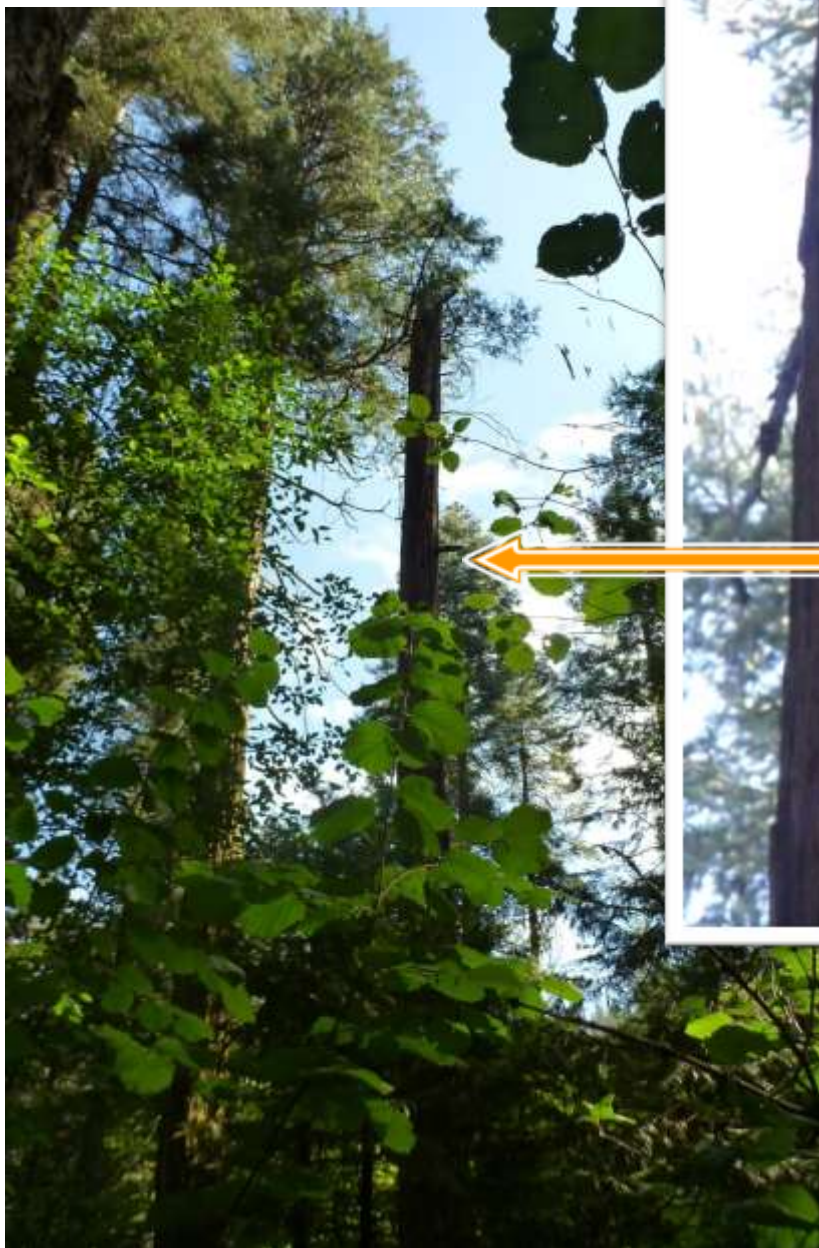
Microsite:
Stick nest

CWHR:
Ponderosa Pine
(patchy 3P and 4M)

Elevation:
4800ft (1460m)

REST SITE #197: Live Ponderosa Pine





REST SITE

#776

FEMALE FISHER

Structure Type:
Conifer Snag

Tree Species:
Incense Cedar

DBH:
54in (136cm)

Height:
102ft (31m)

Microsite:
Cavity

CWHR:
Sierran Mixed
Conifer 6D
(in riparian area)

Elevation:
4800ft (1460m)

REST SITE #776 : Incense Cedar Snag





REST SITE

#277

FEMALE FISHER

Structure Type:
Conifer Snag

Tree Species:
Incense Cedar

DBH:
78in (199cm)

Height:

Microsite:
Cavity

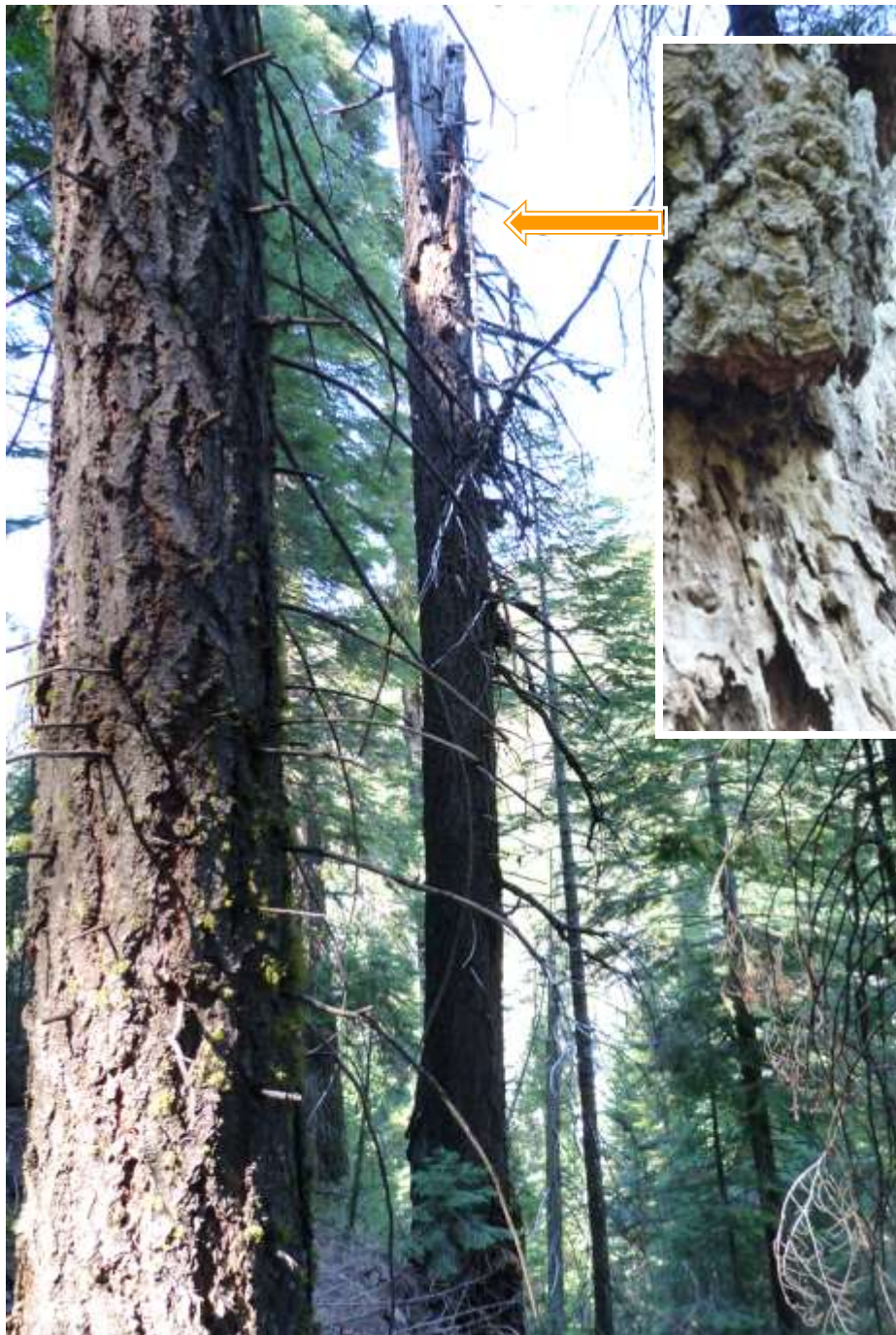
CWHR:
Sierran Mixed
Conifer 6D

Elevation:
6500ft (1980m)

REST SITE #277: Incense Cedar Snag



Note the photo above was taken after a forest treatment.



REST SITE

#518

FEMALE FISHER

Structure Type:
Conifer Snag

Tree Species:
White Fir

DBH:
36in (92cm)

Height:
48ft (15m)

Microsite:
Cavity/broken top

CWHR:
White Fir 4D

Elevation:
5300ft (1620m)

REST SITE #518: White Fir Snag



REST SITE

#1106

FEMALE FISHER

Structure Type:
Hardwood Snag

Tree Species:
Black Oak

DBH:
22in (57cm)

Height:
41ft (12m)

Microsite:
Cavity

CWHR:
Sierran Mixed
Conifer 4D

Elevation:
4900ft (1490m)



REST SITE #1106: Black Oak Snag





REST SITE

#539

FEMALE FISHER

Structure Type:
Conifer Snag

Tree Species:
White Fir

DBH:
45 in (114 cm)

Height:
77 ft (24 m)

Microsite:
Broken Top

CWHR:
Sierran Mixed
Conifer 6D

Elevation:
4500ft (1370m)

REST SITE #539: White Fir Snag



REST SITE

#780

FEMALE W/ KITS

Structure Type:
Live Hardwood

Tree Species:
Black Oak

DBH:
28in (71cm)

Height:
46ft (14m)

Microsite:
Cavity

CWHR:
Sierran Mixed
Conifer 6D

Elevation:
5500ft (1680m)



REST SITE #780: Live Black Oak





REST SITE

#722

FEMALE W/ KITS

Structure Type:
Hardwood Log

Tree Species:
Black Oak

DBH:
25in (63cm)

Length:
57ft (17m)

Microsite:
Cavity

CWHR:
Montane Hardwood
Conifer 4M

Elevation:
3800ft (1160m)

REST SITE #722: Black Oak Log





REST SITE

#131

FEMALE W/ KITS

Structure Type:
Conifer Log

Tree Species:
Incense Cedar

DBH:
31 in (79 cm)

Length:
75 ft (23 m)

Microsite:
Cavity

CWHR:
Sierran Mixed
Conifer 6D
(riparian area)

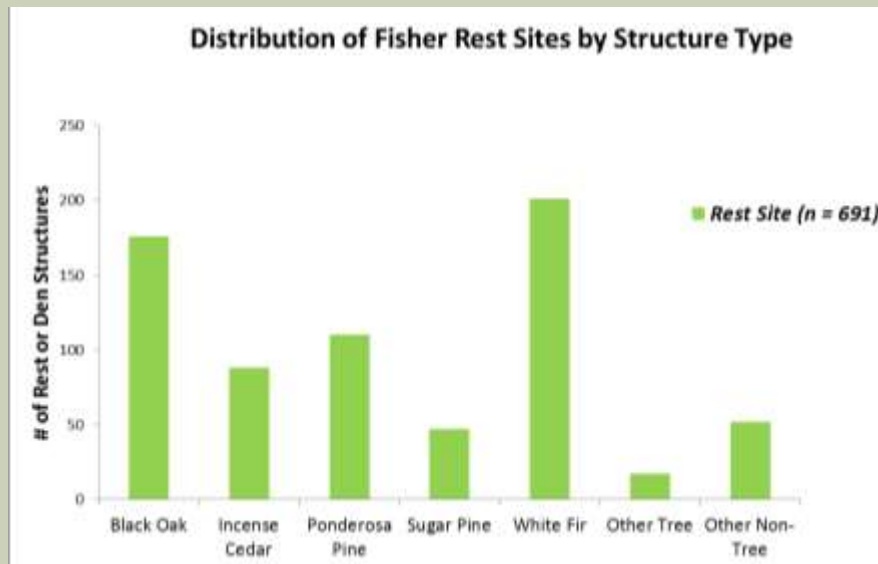
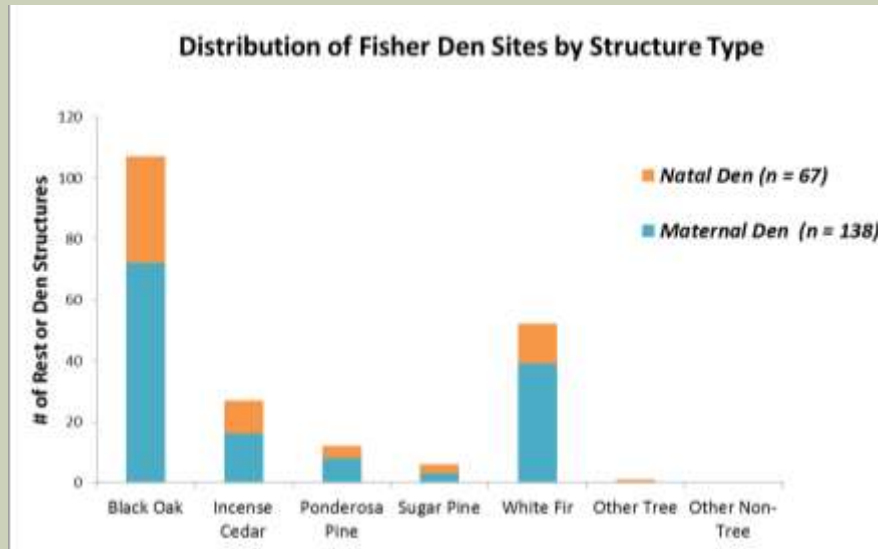
Elevation:
4800ft (1460m)

REST SITE #131: Incense Cedar Log



Surrounding riparian habitat

The data presented here represent a preliminary summary of the structures used by fishers in the Kings River study area as reproductive dens and daily resting sites. California black oaks were selected most often for dens. Fishers used a variety of tree species and other structures as rest sites, but white fir, California black oak, ponderosa pine and incense cedar were the tree species used most frequently.



Tree Species or Other Structure	Type	Natal Den (n = 67)	Maternal Den (n = 138)	Rest Site (n = 691)
Alder	live			2
Big Leaf Maple	live			2
Black Oak	live	31	65	153
	snag	4	6	18
	log		1	5
Canyon Live Oak	live	1		5
Douglas Fir	live			1
Giant Sequoia	log			1
Incense Cedar	live	10	4	42
	snag	1	11	24
	log		1	22
Jeffrey Pine	live			3
	snag			1
Ponderosa Pine	live	2	4	88
	snag	2	4	14
	log			8
Red Fir	snag			2
Sugar Pine	live	1	1	31
	snag	2	2	14
	log			2
White Fir	live	10	20	98
	snag	3	19	97
	log			6
Rock Pile/Ground Burrow	n/a			41
Stump/Snow Burrow/Other	n/a			11

Preliminary summary of tree diameter measurements of fisher rest and den sites in the Kings River study area

DEN SITES				
Structure		<i>n</i>	Mean dbh	stdev (in)
Hardwood	live tree	105	30.9 in (78.3 cm)	7.7
	snag	10	27.8 in (70.5 cm)	5.3
	log	1	25.6 in (65 cm)	n/a
Conifer	live tree	54	43.1 in (109.3 cm)	9.6
	snag	43	41.7 in (105.9 cm)	12.1
	log	1	48.1 in (122 cm)	n/a
REST SITES				
Structure		<i>n</i>	Mean dbh	stdev (in)
Hardwood	live tree	81	30.8 in (78.2 cm)	8.5
	snag	9	33.2 in (84.2 cm)	10.2
	log	2	20.1 in (51.1 cm)	6.4
Conifer	live tree	112	37.3 in (94.6 cm)	14.0
	snag	11	44.0 in (111.6 cm)	12.2
	log	78	36.8 in (93.3 cm)	14.6

Note: This table will be updated as additional structures are found and measured. Please see previous slide for distribution of hardwood and conifer tree species used by fishers in the Kings River area.

ACKNOWLEDGMENTS

Many Kings River Fisher Project Crew members helped to collect this data and take some incredible photos, including:

Jason Banaszak, Jessica Braunstein, Theresa Brickley, Jim Garner, Nathan Hebert, Cori Indelicato, Zane Miller, Brad Nichols, Shawn Rossler, Jon Schneiderman, Brad Smith, Tessa Smith, Wes Watts and Zack Stoll.

THANKS!